AMENDMENTS TO THE DRAWINGS

Applicant requests entry of the drawing corrections to Figs. 1-5.

Attachment: Annotated Sheets of Figs. 1-5
Replacement Sheets of Figs. 1-5

REMARKS

Claims 1-34 are pending in the application. Claims 1-4, 6-10, 12-14, 16-19, 21-24, 26-30 and 32-34 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Wang *et al.* (U.S. Patent No. 6,167,084; hereinafter "Wang"). Claims 5, 11, 15, 20, 25 and 31 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicant submits the arguments below in traversal of the claim rejections.

An embodiment of the Applicant's invention relates to a transcoding apparatus and a method for improving image quality. In the embodiment, a compressed bitstream is decoded at a video decoder. A complexity estimation unit estimates a complexity of a current picture from the decoded pictures and a target bit-allocation unit performs desired bit-allocation using the complexity information of the current picture. A bit-rate control unit controls bit-rate using the bit-allocation information and state information from memory. A video encoding unit encodes the decoded pictures on the basis of the bit-allocation and state information of the bit-rate control unit.

Wang relates to a method and apparatus for allocating bits in a statistical multiplexing system. The statistical multiplexing system receives compressed video programs which are processed by a transcoder 650. A target number of bits for each frame of a program is met by adjusting the quantization parameter in the transcoder 650. The resulting number of compressed bits and the average quantization parameter are sent to the rate control processor 610 which then determines a new target number of bits for each new frame.

Applicant respectfully submits that claim 1 is believed to be patentable because a *prima facie* case of obviousness has not been established. Claim 1 recites:

> A transcoding apparatus comprising:
>
> a video decoding unit which receives a compressed bitstream and performs decoding thereof to output decoded pictures;
>
> *a complexity estimation unit which estimates complexity of a current picture among the decoded pictures to encode the current picture and provides complexity information of the current picture*;
>
> a target bit-allocation unit which performs desired bit-allocation using the complexity information of the current picture;
>
> a bit-rate control unit which controls bit-rate using bit-allocation information and state information from memory, which outputs an encoded bitstream; and
>
> *a video encoding unit which encodes the decoded pictures on the basis of the bit-allocation and state information of the bit-rate control unit.*

For example, Wang fails to teach, suggest or provide motivation for a complexity estimation unit which *estimates complexity of a current picture among the decoded pictures to encode the current picture* and provides complexity information of the current picture, in combination with other elements of the claim. In the Office Action, the Examiner states that column 8, line 54 - column 9, line 15 and Figure 6 discloses the complexity estimation unit. The sections cited by the Examiner disclose a rate control processor 610 which includes a complexity processor 605. The rate control processor 610, however, determines a new target number of bits for each *new* program frame or picture based on the program complexity for the encoded program frame. Col. 9, lines 6-9. There is nothing to suggest that the new target number of bits determined by the rate control processor 610 is applied to the *current* program frame or picture. Therefore, Wang cannot possibly teach, suggest or provide motivation for a complexity estimation unit which

estimates complexity of a current picture among the decoded pictures *to encode the current picture* and provides complexity information of the current picture.

Applicant also submits that it would not have been obvious to one skilled in the art to have the complexity estimation unit use the decoded signal to estimate the complexity as opposed to the encoded signal as the Examiner asserts in an Official Notice.

First, Applicant respectfully request the Examiner to provide prior art which supports his Official Notice.

Second, Applicant submits that the Examiner's purported motivation for having the complexity estimation unit use the decoded signal is improper hindsight. Assuming *arguendo*, that "it would have only been the difference of when in the process the video signal was sent to the complexity estimation unit," such an explanation *still* does not supply the necessary suggestion or motivation to modify Wang in the manner suggested by the Examiner because the explanation only highlights the differences between the invention as claimed and the teachings of Wang.

Further assuming *arguendo*, that a decoded signal is used to estimate the complexity, the Office Action still does not show how the complexity based on the decoded signal would be used to encode the current picture.

Additionally, Wang fails to teach, suggest or provide motivation for a video encoding unit which encodes the decoded pictures on the basis of the bit-allocation and state information of the bit-rate control unit. Although the Examiner cites the encoders 620, 630 and/or the transcoder 640, 650 as corresponding to the video encoding unit, these encoders or transcoders encode a current program frame based on the target number of bits determined from a *previous*

program frame. There is nothing to suggest that the current program is encoded based on a target number of bits determined from the current program frame.

For at least the above reasons, Applicant submits that claim 1 is believed to be patentable. Similar to the reasons submitted for claim 1, claims 12, 17, 22, 32 and 34 are believed to be patentable. For example, Wang fails to teach, suggest or provide motivation for a bit-allocation unit which performs desired bit-allocation using the complexity of the *current picture* (claim 12) or performing desired bit-allocation using the complexity information of the *current picture* (claim 17) in combination with other elements of the claim.

Claims 2-4 and 6-8, which depend from claim 1, claims 13, 14, and 16, which depend from claim 12, claims 18, 19, and 21, which depend from claim 17, and claims 23, 24, and 26-28, which depend from claim 22, are believed to be patentable for at least the reasons submitted for their respective base claims.

In addition, Applicant submits that claim 4 is believed to be patentable because Wang fails to teach, suggest or provide motivation for a transcoding apparatus wherein the complexity estimation unit calculates complexity of a picture to be currently encoded, using complexity of decoded previous *and current pictures output from the video decoding unit*, in combination with other elements of the claim. As argued above, the complexity of a current picture that is being currently encoded has no bearing whatsoever on the encoding of the current picture in Wang.

For reasons similar to those submitted for claim 4, claims 9, 14, 19, 24, 29, and 33 are believed to be patentable.

As a consequence of Wang's inability to utilize the complexity of a current picture for the encoding of the current picture, Wang fails to teach, suggest or provide motivation for, *inter alia,*

a transcoding wherein the bit-allocation unit increases a number of bits to be allocated for the current picture if complexity of an estimated current picture is large, and decreases number of bits to be allocated for the current picture if the complexity of the estimated current picture is small. Therefore, claim 6 is believed to be patentable and for similar reasons, claims 7, 26, and 27 are believed to be patentable.

Applicant adds new claims 34-35 to more fully claim the invention. The new claims are believed to be patentable for at least the reasons submitted for their respective base claims.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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WASHINGTON OFFICE
23373
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Date: June 28, 2005

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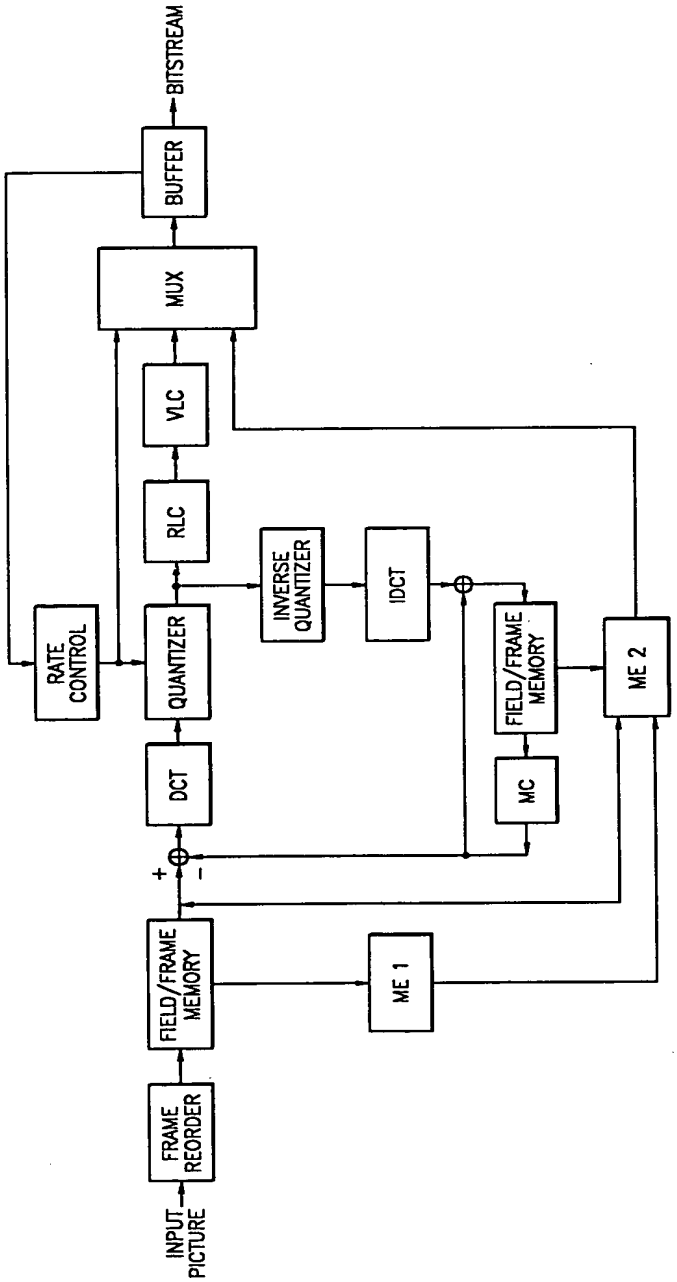
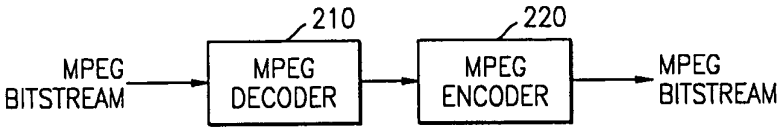
PRIOR ART

FIG. 1



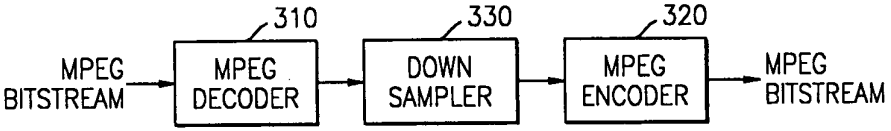
PRIOR ART

FIG. 2



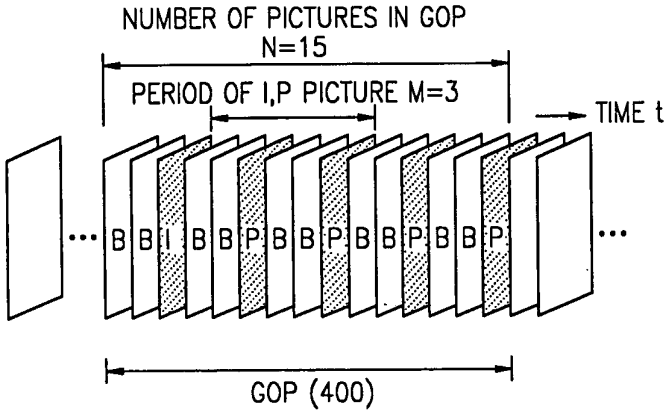
PRIOR ART

FIG. 3



PRIOR ART

FIG. 4



PRIOR ART

FIG. 5

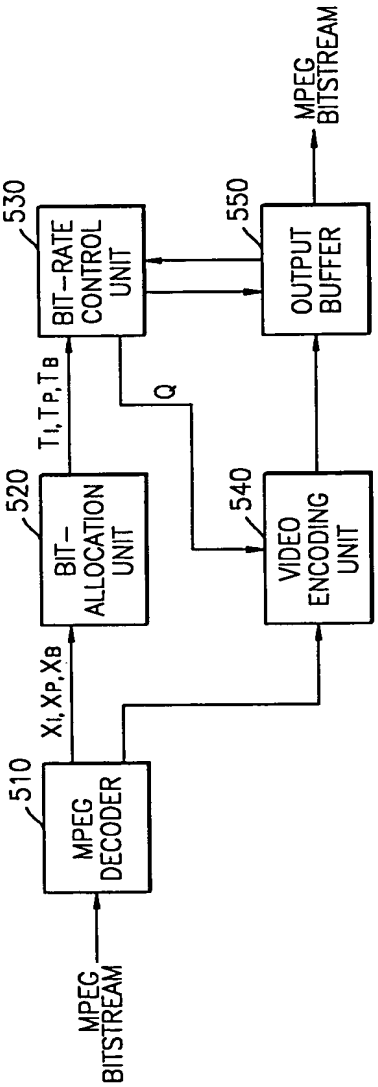
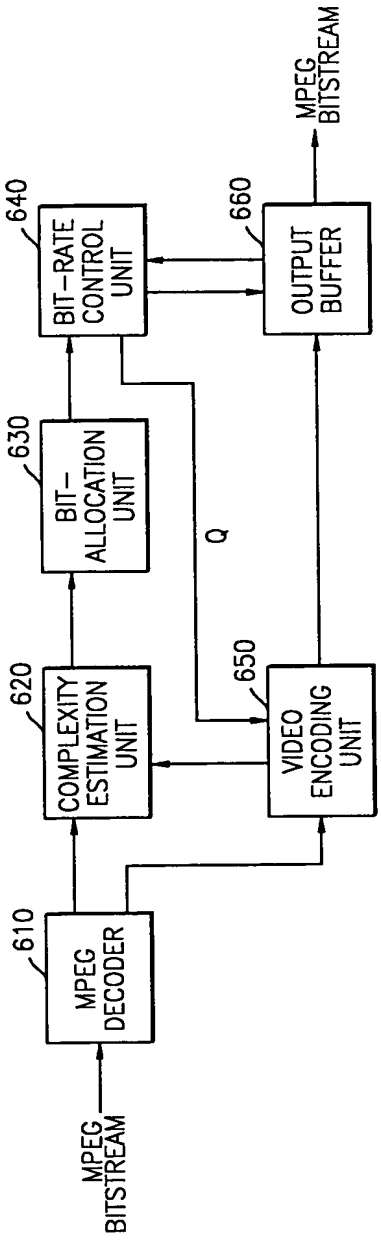



FIG. 6